



Biodiesel Basics

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National Biodiesel Board
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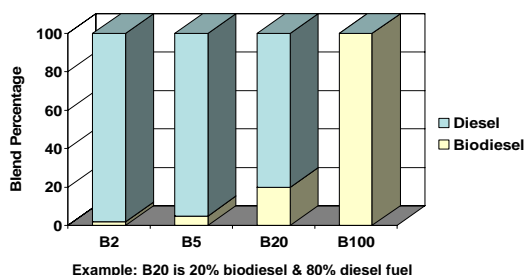


Biodiesel Defined

- ♦ Biodiesel, n. -- a fuel comprised of mono-alkyl esters of long chain fatty acids derived from vegetable oils or animal fats, designated B100, and meeting the requirements of ASTM D 6751.
- ♦ Biodiesel blend, n. -- a blend of biodiesel fuel meeting ASTM D 6751 with petroleum-based diesel fuel designated BXX, where XX is the volume percent of biodiesel.



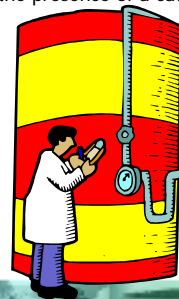
Biodiesel Blends



The Biodiesel Reaction

In the presence of a catalyst

Combining
**Vegetable Oil
or
Animal Fat
(100 lbs.)**
+
**Methanol or
Ethanol
(10 lbs.)**



Yields
**Biodiesel
(100 lbs.)**
+
**Glycerine
(10 lbs.)**



EPA Act Economics

- ♦ Biodiesel is the most economical way to meet EPA Act AFV requirements
- ♦ If B20 blends cost \$.20 per gallon more than #2 Diesel, it will cost approximately \$450 per EPA Act credit
 - 2,250 gallons of B20 required per AFV credit
 - X \$.20 per gallon B20 incremental cost
 - \$450.00 per AFV credit**
- ♦ Medium and Heavy Duty vehicles can earn multiple credits
- ♦ Biodiesel usage also counts toward your Executive Order 13149 goals




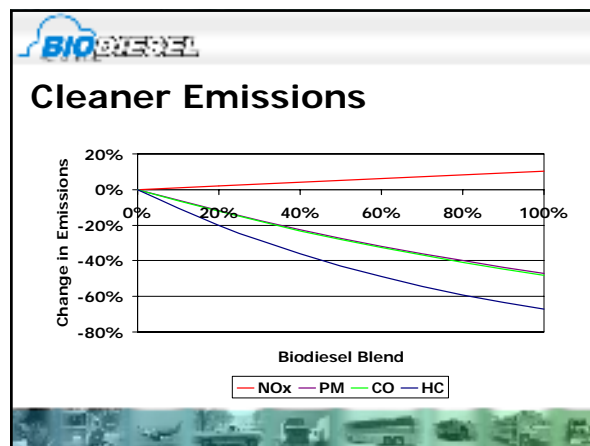
EPA Act Cost Sensitivity to Incremental B20 Cost

B20 Incremental Cost (\$/Gallon)	EPA Act Credit Cost (\$/Credit)
\$.01	\$22.50
\$.10	\$225
\$.20	\$450
\$.30	\$675
\$.40	\$900
\$.50	\$1,125

BIO DIESEL

Environmental Attributes

- ♦ **Energy Balance** - for every one unit of energy needed to produce biodiesel, 3.2 units of energy are gained.
- ♦ **Biodegradable and Non-Toxic** - Tests sponsored by the United States Department of Agriculture confirm that biodiesel is safer than diesel and biodegrades as fast as dextrose, a test sugar.
- ♦ **Greenhouse Gases** - A 78% life cycle decrease in CO₂ according to a USDA and DOE study.


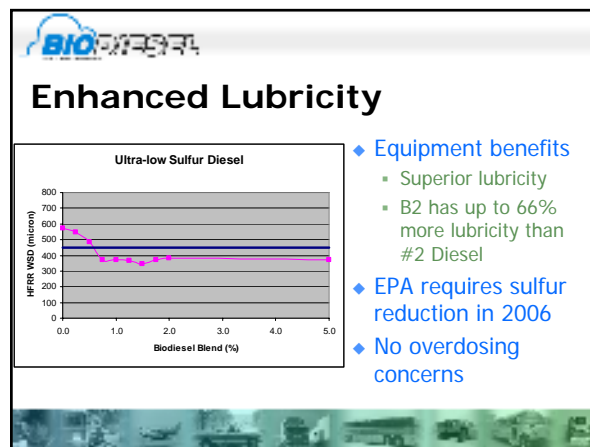



BIO DIESEL

Cleaner Emissions

Emission Type	B100	B20
Total Unburned Hydrocarbons	-67%	-20%
Carbon Monoxide	-48%	-12%
Particulate Matter	-47%	-12%
Oxides of Nitrogen (NO _x)	+10%	+2%

Emissions data taken from EPA Draft Document, A Comprehensive Analysis of Biodiesel Impacts on Exhaust Emissions, Oct. 2002. EPA420-P-02-001

BIO DIESEL

Biodiesel Performance Properties



Biodiesel Returns Environmental Benefits Without Sacrificing Operating Performance


- ♦ B20 has Similar Performance to Petrodiesel:
 - Torque
 - Horsepower
 - Mileage
 - Range
- ♦ BTU Content
 - (1 – 2% less than #2 diesel)
- ♦ Cold Flow
 - (3-5 °F > for soy-based B20)



BIO DIESEL

Keys to a Smooth Transition

- ♦ Purchase biodiesel from a reputable supplier meeting ASTM D6751
- ♦ Make sure storage tanks are clean
- ♦ Biodiesel may clean sediments and accumulated materials existing on fuel system surfaces
- ♦ B20 filter changes happen in 2% of cases when first starting up, B2 no changes realized
- ♦ Once sediments are cleaned from the system, filter changes will return to normal



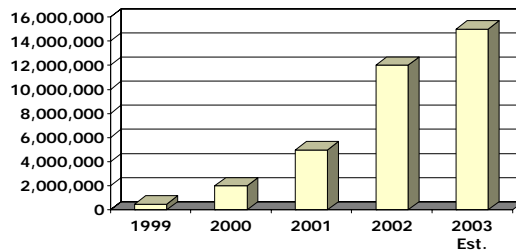


Industry Trends

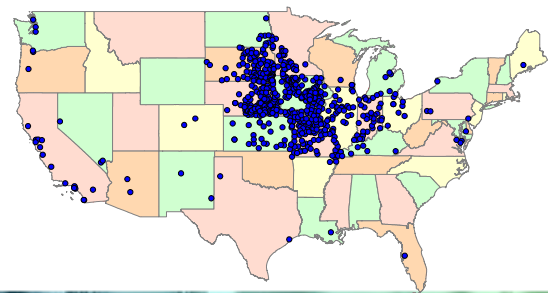
- ◆ Fuel suppliers are expanding
- ◆ Demand continues to grow
- ◆ Legislative efforts to make biodiesel cost competitive are ongoing
- ◆ Relationships with OEMs continue to be built
- ◆ ASTM D6751 specification is complete
- ◆ BQ-9000 Quality Program is being launched



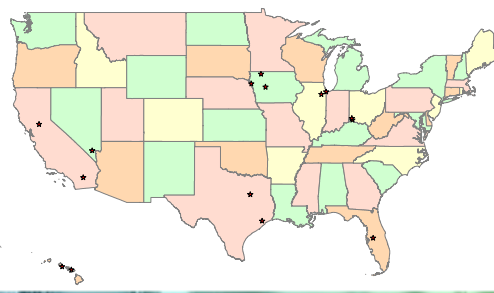
Biodiesel Demand



Bulk Distribution Locations



Production Locations



Additional Information

- ◆ National Biodiesel Board
 - 888-BIODIESEL
 - www.biodiesel.org

